

USE OF FARM CHICKEN CARCASSES BY THE EAGLE OWL *Bubo bubo*

CONSUMO DE CADÁVERES DE POLLOS DE GRANJA POR EL BUHO REAL *Bubo bubo*

David SERRANO*

The diet of the Eagle Owl *Bubo bubo* has been widely studied, showing the bird's outstanding trophic eclecticism in the whole of its distribution range (see reviews by Mikkola, 1983; Cramp, 1985). However, the carrion-eating habits of Eagle Owls are little known. The greater part of the authors that have addressed the subject go no further than to mention the bird's capacity to eat carrion (Frey, 1973; Cugnasse, 1983; Orsini, 1985; Défontaines, 1993). On the other hand, the consumption of poultry by Eagle Owls has been previously observed (Pérez-Mellado, 1980; Real *et al.*, 1985; Papa-georgiou *et al.*, 1993) and, although in most cases the source of this prey is not clear, the bird seems to be able to capture poultry alive in the farm buildings (Willgohs, 1974; D. Serrano, unpubl. data).

The present paper provides information on the probable regular consumption of farm chicken *Gallus domesticus* carcasses by Eagle Owls *Bubo bubo*. The study area covers 1150 km² and it is located in the middle part of the Ebro river valley (Zaragoza province, NE Spain; 41°35'N, 0°55'E), where the Eagle Owl inhabits semi-arid ravines of gypsum, marl, clay and limestone. Between 1994 and 1998, pellets were collected in fourteen Eagle Owl territories, located between 250 and 550 m above sea level (Serrano, 1998). The methodology used was the usual in this type of studies, ignoring the loose bones and feathers found at the bird's feeding sites in order to avoid underestimating the proportion of small-sized prey (Olsson, 1979; Donázar, 1989). Additional information on the methodology and on the estimation of the biomass of each prey species can be found in Serrano (1998). In the case of chickens *Gallus domesticus*, an average weight of 1500 g was estimated on the basis of seven individuals

weighed at one corpse disposal site close to a chicken farm (see below) and of two individuals found at one Eagle Owl nest.

Globally, chicken carcasses make up 0.4% of the prey ($n = 3670$) of two out of fourteen Eagle Owl pairs whose diet was determined in the study area (hereafter A and B territories, see also pairs 13 and 14 in Serrano, 1998). Remains of two chickens were found in pellets from territory A ($n = 193$), while remains of 12 chickens were identified in the pellets of the owls breeding in territory B ($n = 606$). Table 1 shows the frequency of appearance and the contribution in biomass of each prey in the diet of these two pairs. Although chicken consumption by the owls was low in comparison with other prey, the biomass contribution to the diet in both pairs seemed to be important.

Seasonal collection of pellets allowed us to compare the importance of poultry in the diet of pair B throughout the year. The consumption of chicken carcasses was detected in this territory at least in winter, spring, and summer of 1996, and in the winter of 1997. The contribution in biomass of *Gallus* increased notably in winter and spring, while it decreased in summer and autumn (25.5% vs. 6.9%, Yates corrected $\chi^2_1 = 5858.53$, $P < 0.0001$). On the other hand, the two chicken found in the pellets of pair A were consumed in spring of 1996.

Dead chickens come from three intensive breeding farms located in a village close to the nesting areas of pairs A and B. The overall capacity of these farms is close to 200000 individuals. Plumage characteristics of carcasses and feathers found in the plucking sites and nests of Eagle Owls confirmed that all the carcasses came from these farms. All those chickens had a white plumage, that was very rare outside intensive breeding farms in the study area. In ad-

* Departamento de Biología Aplicada. Estación Biológica de Doñana (CSIC). Pabellón del Perú. Avda. María Luisa s/n. 41013 Sevilla, Spain. E-mail: serrano@ebd.csic.es

TABLA 1

Relative frequency of appearance (%N) and biomass (%B) for *Gallus domesticus* and other prey-items captured by *Bubo bubo* in two territories of the mid part of the Ebro river valley, NE Spain. See Serrano (1998) for further details.

[Frecuencia relativa de captura (%N) y biomasa (%B) para *Gallus domesticus* y otras presas capturadas por *Bubo bubo* en dos territorios del valle medio del Ebro, NE de España. Para más detalles, véase Serrano (1998).]

	TERRITORIES			
	A (n = 193)		B (n = 606)	
	% N	% B	% N	% B
Insectivora	0	0	1.9	5.3
Lagomorpha	38.3	59.0	13.2	48.3
Rodentia	33.7	5.6	49.7	6.7
Accipitriformes	3.1	8.0	0.3	0.4
Galliformes ^(a)	2.6	5.2	2.5	5.7
<i>Gallus domesticus</i>	1.0	7.8	2.0	16.6
Columbiformes	1.0	2.6	4.8	8
Strigiformes	1.6	1.3	2.5	2.4
Passeriformes	5.7	5.2	3.6	2.1
Other Aves	2.6	1.9	0.3	0.5
Reptilia	7.3	3.4	6.8	3.8
Arthropoda	3.1	0	12.4	0.2

dition, the chickens remain in batteries all year round in farms, so that the possibility that the owls have captured live birds seems extremely unlikely. The nests of the two pairs of Eagle Owl exploiting this resource are 2350 m apart. These nests are placed at 1250 and 350 m, respectively, from the nearest carcass disposal sites. Two more pairs have their nesting site at a distance of about 2000 m from a small chicken farm, but all the dead poultry in this farm are buried, preventing the owl's access to the carcasses. For the rest of the pairs, the nearest poultry farms are more than 7000 m away from their nesting sites.

In relation to seasonal variations in the consumption of *Gallus*, the availability of this resource does not seem to change substantially throughout the year (F. Catalán, com. pers.). In winter-spring, the trophic needs of *Bubo bubo* would be increased by its breeding requirements, which would explain the greater importance of such a high biomass resource in the bird's diet at this time.

The high biomass provided by chicken carcasses, together with the minimal energy expenditure required to obtain them as compared to live prey of similar size, would explain its

high «food value» for Eagle owls. On the other hand, the size and nocturnal habits of Eagle Owls reduce the possibilities of direct interspecific competition with other scavengers, a restrictive phenomenon in the use of small carcasses by birds (Hiraldo *et al.*, 1991). The Eagle Owl proves to be efficient in the exploitation of this resource, as it makes use integrally of the chicken carcasses, carrying them whole to the plucking sites and nests.

The hunting area of Eagle Owls is estimated to cover a distance from 1 to 7 km around the nest, showing its lowest values in the breeding season (see Ruiz-Martínez *et al.*, 1996 for a review). This short hunting range, that can be attributed to the limitation to exploit thermals for foraging due to the nocturnal habits of the Eagle Owls, would explain why this type of trophic resource was used by those pairs with dump sites close to the nests only. Likewise, it is possible that the Eagle Owl only resorts to the use of carrion in conditions of scarcity of live prey of high food value (Cugnasse, 1983), as is suggested by the high rates of consumption of small rodents (a suboptimal prey for Eagle Owls in Mediterranean Europe; see Hiraldo *et al.*, 1976), in these two territories (Table 1, see

also Serrano, 1998, for variations in the diet between these two pairs and others inhabiting similar habitats).

ACKNOWLEDGEMENTS.- J. A. Donázar, J. L. Tella, M. Díaz, J. A., Hódar and an anonymous referee made useful comments on a previous version. I also would like to thank J. Boucher and V. Boucher for their assistance in the translation to English.

BIBLIOGRAPHY

- CRAMP, S. (Ed.). 1985. *The Birds of the Western Palearctic. Vol. IV*. Oxford University Press. Oxford.
- CUGNASSE, J.M. 1983. Contribution à l'étude du Hibou Grand-duc, *Bubo bubo*, dans le sud du Massif Central. *Nos Oiseaux*, 37: 117-128.
- DÉFONTAINES, P. 1993. Contribution du Grand-duc d'Europe *Bubo bubo* à la découverte dans L'Hérault d'un crabe d'eau douce du genre *Potamon*. *Alauda*, 61: 58-60.
- DONÁZAR, J.A. 1989. Variaciones geográficas y estacionales en la alimentación del Búho Real (*Bubo bubo*) en Navarra. *Ardeola*, 36: 25-39.
- FREY, H. 1973. Zur Oekologie Niederösterreichischer Uhupopulationen. *Egretta*, 16: 1-68.
- HIRALDO, F., PARREÑO, J. J., ANDRADA, J. & AMORES, F. 1976. Variations in the food habits of the European Eagle Owl (*Bubo bubo*). *Doñana Acta Vertebrata*, 3: 137-156.
- HIRALDO, F., BLANCO, J. C. & BUSTAMANTE, J. 1991. Unspecialized exploitation of small carcasses by birds. *Bird Study*, 38: 200-207.
- MIKKOLA, H. 1983. *Owls of Europe*. T. & A.D. Poyser. Berkhamsted.
- OLSSON, V. 1979. Studies on a population of Eagle Owls. *Viltrevy*, 11: 1-99.
- ORSINI, P. 1985. Le régime alimentaire du Hibou Grand-duc *Bubo bubo* en Provence. *Alauda*, 53: 11-28.
- PAPAGEORGIOU, N., VLACHOS, C. & BAKALLOUDIS, D. 1993. Diet and nest site characteristics of Eagle Owl (*Bubo bubo*) breeding in two different habitats in north-eastern Greece. *Avocetta*, 17: 49-54.
- PÉREZ-MELLADO, V. 1980. Alimentación del Búho Real (*Bubo bubo* L.) en España Central. *Ardeola*, 25: 93-112.
- REAL, J., GALOBART, A., & FERNÁNDEZ, J. 1985. Estudi preliminar d'una població de Duc (*Bubo bubo*) al Vallès i Bages. *Medi natural del Vallès*, 175-187.
- RUIZ-MARTÍNEZ, I., HÓDAR, J. A., & CAMACHO, I. 1996. Cantonement et comportement vocal du Grand-duc d'Europe *Bubo bubo* dans les monts de la Sierra Morena (sur de l'Espagne). *Alauda*, 64: 345-353.
- SERRANO, D. 1998. Diferencias interhábitat en la alimentación del Búho Real (*Bubo bubo*) en el valle medio del Ebro: efecto de la disponibilidad de Conejo (*Oryctolagus cuniculus*). *Ardeola*, 45: 35-46.
- WILLGOHS, J.F. 1974. The Eagle Owl *Bubo bubo* (L.) in Norway. *Sterna*, 13: 129-177.

[Recibido: 1-2-00]

[Aceptado: 28-3-00]

